



RECEIVED

DEC 16 1991

DIVISION OF
OIL GAS & MINING

DOGM
MINERALS PROGRAM
FILE COPY

M/021/004

December 13, 1991

Mr. Robert L. Morgan, P.E.
Division of Water Rights
Department of Natural Resources
State of Utah
1636 West North Temple, Suite 220
Salt Lake City, Utah 84116-3156


RE: Escalante Unit Tailings Impoundment - Responses to the Division of Water Rights Comments

Dear Mr. Morgan:

Enclosed are responses to your September 18, 1991, letter regarding the hydrology study for our Escalante Unit tailings impoundment, prepared by our hydrologic consultants.

If you have additional questions concerning the hydrologic analysis or the responses to your comments, please give me a call.

Very truly yours,


Gary R. Gamble
Environmental Engineer

GRG:csm

Enclosure

cc: D. Wayne Hedberg - Utah Division of Oil, Gas and Mining

GRANT, SCHREIBER & ASSOCIATES

Harbor Center, Suite 220
1000 W. Hubbard Avenue
Coeur d'Alene, Idaho 83814
(208) 667-8602 FAX: (208) 667-2426

Other Branch Offices of James L. Grant & Associates, Inc.
Denver, CO • Hot Springs, AR • Salt Lake City, UT • San Diego, CA

December 12, 1991

Dr. Larry A. Drew
Manager of Environmental Affairs
Hecla Mining Company
6500 Mineral Drive
Coeur d'Alene, ID 83814-1931

DOGM
MINERALS PROGRAM
FILE COPY

Subject: Responses to State of Utah Comments
Tailings Dam Hydrologic Study
GSA Correspondence No. 610449.57

Dear Mr. Drew:

In response to the State of Utah Division of Water Rights (DWR) comments on our Tailings Dam Hydrologic Study, dated August 27, 1991, we have prepared the following responses to the three concerns expressed by the DWR:

1. Because of the grading and contouring of the impoundment cover, water will not pool on the cap. As shown on the longitudinal and cross section views of Drawing No. 11359 that were enclosed with the report, the cover is designed to drain surface runoff towards the ditches without ponding any water. In the event that a storm large enough to cause overtopping of the impoundment runoff ditch, water may be temporarily pooled around the edge of the impoundment cover; however, this would only occur until flow in the ditches subsided to the point that overtopping was no longer occurring. Water pooled against the cap could then drain to the impoundment runoff ditches. Only a negligible amount of seepage could occur during this time because of the low-permeability clay layer in the impoundment cover.
2. The underdrain system is currently flowing freely, with the outflow being collected in tanks at the mill site. The drains will be capped after the impoundment cover is in place. As demonstrated in the reclamation plan, seepage through the proposed impoundment cover will be an average of 0.003 inches per year, based upon simulations using EPA's Hydrologic Evaluation of Landfill Performance (HELP) model. Thus, the anticipated seepage is negligible. In addition, the dam, which was designed by Fox Consultants, Inc., was designed to withstand a full hydraulic condition. Thus, even if minor seepage were to occur and a small quantity of water accumulated in the impoundment, the design and construction of the dam has accounted for stability under those conditions. However, the amount of water that could potentially pond against the dam is small and will not pose a threat to the long-term stability of the dam.
3. The ditches will be lined with riprap in the area of the dam abutments and the hillslopes leading to the natural channel below the dam, as

shown on the enclosed drawing. The riprap specifications required to withstand erosion resulting from the 100-year runoff are as follows:

- *Impoundment Ditches:* The impoundment ditches will require riprap with a mean diameter (D_{50}) of at least 0.6 inches and a layer thickness of at least 12 inches.
- *North Abutment Hillslope:* The hillslope east of the north abutment of the dam will require riprap with a mean diameter of 2.25 feet and a layer thickness of 3.375 feet.
- *South Abutment Hillslope:* The hillslope west of the south abutment of the dam will require riprap with a mean diameter of 2 feet and a layer thickness of 3 feet.

The required size and thickness of riprap was determined from methods developed by Nelson, et. al¹. Construction of the steep ditches will be similar to an energy dissipation basin below a culvert emerging from a steep embankment. The ditches will be partially cut into the hillsides, and will be lined with riprap. Larger riprap will be placed at the bottom of the slopes to act as roughness blocks, which will assure that the flow in the natural channel below the dam is subcritical. Material excavated from the hillsides to construct the ditches will be used in the impoundment cover. The dimensions of the impoundment ditch (trapezoidal channel with an 8 foot bottom width and 4:1 side slopes) will be maintained in the steep hillslope ditches. These dimensions require shallow excavation and will result in shallow flow depths (approximately 1 foot), which will allow the flow to spread out when it reaches the natural channel below the dam. The riprap will be placed in the areas shown on the enclosed drawing. The placement of riprap in these areas will prevent backcutting of the hillslope channels and potential erosion of the dam abutments during large storm events.

We hope that these responses to the DWR concerns meet with your approval. We appreciate the opportunity our services to Hecla on this project. If you have any questions or need additional information, please contact us.

Very truly yours,

GRANT, SCHREIBER & ASSOCIATES

Kevin S. Rauch

Kevin S. Rauch
Staff Engineer

David L. Schreiber

Dr. David L. Schreiber, P.E.
Vice President & Corporate Consultant

¹ Nelson, J.D., S.R. Abt, R.L. Volpe, D. van Zyl, N.E. Hinkle, and W.P. Staub, "Methodologies for Evaluating Long-Term Stabilization Designs of Uranium Mill Tailings Impoundments," prepared for the U.S. Nuclear Regulatory Commission, NUREG/CR-4620, June 1986.